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I, LEANNE MYNOTT, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 1852 for a patent by CANON KABUSHIKI KAISHA filed on 27 July 1999.

I further certify that pursuant to the provisions of Section 38(1) of the Patents Act 1990 a complete specification was filed on 07 October 1999 and it is an associated Application to Provisional Applications Nos. PP 6419, PQ 0289, PQ 0290 and PQ 1852 and has been allocated No. 53527/99

WITNESS my hand this
Twenty-eighth day of October 1999

LEANNE MYNOTT
TEAM LEADER EXAMINATION
SUPPORT AND SALES

S & F Ref: 459912

ORIGINAL

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Patents Act 1990

PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:

A Smart Card with User Customised Tactile Function Indicia

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Inventor(s) Name(s): Sue Ken-Yap and Stephen Robert Bruce

This invention is best described in the following statement:

A SMART CARD WITH USER CUSTOMISED TACTILE FUNCTION INDICIA

Technical Field of the Invention

The present invention relates to smart cards and, in particular, to a method and apparatus for indicating by means of a tactile indication, the locations and functions of various indicia of the smart card.

Background Art

Smart cards are small electronic devices with prestored information relating to various digital functions. Typically the smart card includes printed indicia on its upper surface which are used in order to initiate various functions.

Smart cards are operated by being inserted into a smart card reader. In general there are two types of such readers. The first type uses a transparent touch sensitive membrane which lies over the upper surface of the card. Touching the membrane above a given indicium registers on the membrane with given coordinates. There is a mapping between the membrane coordinates and the indicia and thus which indicia has been indicated can be determined.

The other type of smart card reader uses a capacitative array below the smart card. When the user points to the indicium on the surface of the card, the self-capacitance of the user's finger changes the charge on the capacitive array. In this way the indicium touched is able to be ascertained. The present invention is concerned only with smart cards intended to be used in conjunction with this latter type of smart card reader.

The present invention arises because it is in some instances disadvantageous to be required to read the smart card indicia since this slows down the desired operation. For example, in browsing through a long sequence of images, only some of which are to be printed for subsequent investigation, the viewer activates either a "print" indicium or a "next" indicium depending on whether the particular image being displayed is to be printed or whether the next image in the sequence is to be displayed instead. Naturally, if it is necessary for the viewer on each occasion to look down onto the smart card itself before being able to ascertain which indicium to select, this very substantially slows the rapidity with which the viewer can view all the images in the sequence.

A similar situation arises where viewing is occurring in darkened circumstances, for example whilst watching TV, and the viewer wishes to change channels. Under these circumstances it is very disruptive to increase the level of illumination to a point where indicia on the smart card can be read to identify the required indicium to be pressed to select the desired channel.

Other scenarios will arise such as that where the operator may have good long distance sight for viewing a screen, but poor short distance sight required to view the indicia on the smart card.

Disclosure of the Invention

It is an object of the present invention to substantially overcome, or at least ameliorate, the abovementioned disadvantages by the provision of a tactile indication as to the location and function of the various smart card operations so that the operator may perform the necessary operations by touch rather than by sight.

In accordance with a first aspect of the present invention, there is disclosed a smart card having a plurality of functions selectable by the touch of a user on an operative surface of the card, wherein said operative surface is provided with a like plurality of user customised tactile indicia each of which corresponds to one of said functions.

In accordance with a second aspect of the present invention there is disclosed a method of user customising a smart card having a plurality of functions selectable by the touch of a user on an operative surface of the card, said method comprising the step of providing a like plurality of user customised tactile indicia each of which corresponds to one of said functions.

Brief Description of the Drawings

An embodiment of the present invention will now be described with reference to the drawings, in which:

Fig. 1 is a perspective view of a prior art smart card;

Fig. 2 is a similar view but of the smart card of the preferred embodiment of the present invention;

Fig. 3 is a transverse cross-sectional view along the line III-III of Fig. 2;

Fig. 4 illustrates a substantially conventional cutting plotter operated by computer software;

Fig. 5 is a side elevation of embossing pins; and

Fig. 6 is a perspective view from above of an array of the embossing pins of Fig. 5.

Detailed Description including Best Mode

As seen in Fig. 1, a smart card 1 is provided with an upper surface. Marked on the upper surface 2 are various boundaries 3 which indicate the locations of operations able to be performed by the smart card 1 and indicia 4 in the form of text which indicates the function of each of the various operations. The boundaries 3 and indicia 4 are created

by printing in a conventional manner. In the particular smart card illustrated in Fig. 1 there are five functions as follows: PAUSE 6, STOP 7, END 8, FAST FORWARD 9 and START 10.

It will be apparent that the arrangement of Fig. 1 suffers from the disadvantages referred to above if it is required to be used in the dark, if the user is long-sighted, if the user wishes not to divert his attention from a computer screen, and the like.

In accordance with the preferred embodiment of the present invention, as schematically illustrated in Fig. 2, the boundaries 3 and indicia 4 are each replaced by an area 12 which has a unique tactile characteristic. Thus the PAUSE indicium 6 is replaced by a Cross of St George, the STOP indicium 7 is replaced by a Cross of St Andrew, the END indicium 8 is replaced by an area of cross-hatch grooving, the FAST FORWARD indicium 9 is replaced by an area of diagonal grooving, and the START indicium 10 is replaced by an annular area of lower elevation having a central pillar of original elevation. The nature of the tactile indicia are clearly illustrated in Fig. 3 where the regions are seen in exaggerated cross-section.

It will be apparent that each of the areas 12 in Fig. 2 is able to be distinguished by touch by the user and therefore in order to operate the smart card 1 it is not necessary for the smart card 1 to be illuminated, or for the user to divert his attention from some other object such as a screen which the smart card controls.

Turning now to Fig. 4, a computer driven cutting plotter 21, known per se and its controlling computer 22 are illustrated. The user of the smart card 1 places the smart card on the cutting table 23 and the computer 22 is loaded with data to indicate the position of the machined areas 12 and the nature of the machining. Thereafter, the machining can be carried out by the cutting plotter 21 so as to create the necessary machined areas 12.

In this way the user is able to determine for himself what type of tactile characteristic the user wishes to represent each function. That is to say the user determines that the pause indicium is to be represented by the Cross of St. George, and not, say, by a Maltese Cross. As a consequence, the user can carry out the operations by touch and memory without the necessity to read any indicia. This provides an important distinction between the present invention and, for example, Braille where it is necessary for the user to effectively learn an alphabet based on positions of dots (essentially a code) prior to being able to read Braille.

It is not necessary for the tactile characteristic to be formed by cutting as indicated in Fig. 4. Instead the printing technique of thermography can be used. This

process produces a raised image by means of a resin "ink" which is printed onto a surface and then "baked". During the baking the resin expands to produce a raised surface. Many business cards use this process to create an expensive appearance.

Another printing process which creates a raised surface is embossing. This can be done using pins 30 set out in dot matrix fashion with high resolution as schematically illustrated in Figs. 5 and 6. The array 31 of pins illustrated in Fig. 6 would print part of, or all of, a single letter, for example. The pins 30 can be operated under computer control and thereby raised to permanently deform, or emboss, a substrate which is to form the upper surface of the smart card. For example, an embossed paper sheet can be glued to the upper surface 2.

Irrespective of the process used to create the tactile characteristic, the ability of the user to select his own tactile characteristics to suit the function he has programmed into his own smart card creates a user versatility which is highly thought of by many users.

Industrial Applicability

It is apparent from the above that the embodiment(s) of the invention are applicable to smart card and man/machine interface applications.

The foregoing describes only some embodiments of the present invention and modifications, obvious to those skilled in the art can be made thereto without departing from the scope of the present invention.

The term "comprising" as used herein is used in the inclusive sense of "including" or "having" and not in the exclusive sense of "consisting only of".

Claims:

1. A smart card having a plurality of functions selectable by the touch of a user on an operative surface of the card, wherein said operative surface is provided with a like plurality of user customised tactile indicia each of which corresponds to one of said functions.

2. The smart card as claimed in claim 1 wherein said operative surface comprises a substrate affixed to a surface of the card.

3. The smart card as claimed in claim 2 wherein said substrate is printed using thermography to form said tactile indicia.

4. The smart card as claimed in claim 2 wherein said substrate is embossed to form said tactile indicia.

5. The smart card as claimed in claim 1 wherein said tactile indicia are directly formed on said operative surface of said card.

6. The smart card as claimed in claim 5 wherein said tactile indicia are formed by thermography.

7. The smart card as claimed in claim 5 wherein said tactile indicia are formed by machining said operative surface.

8. The smart card as claimed in claim 7 wherein said operative surface is machined in a computer controlled cutting plotter.

9. A method of user customising a smart card having a plurality of functions selectable by the touch of a user on an operative surface of the card, said method comprising the step of providing a like plurality of user customised tactile indicia each of which corresponds to one of said functions.

10. The method as claimed in claim 9 including the further steps of providing said tactile indicia on a substrate and affixing the substrate to said operative surface.

11. The method as claimed in claim 10 including the further step of forming said tactile indicia on said substrate by thermography.

12. The method as claimed in claim 10 including the further step of forming said tactile indicia on said substrate by embossing.

13. The method as claimed in claim 9 including the further step of forming said tactile indicia directly on said operative surface.

14. The method as claimed in claim 13 including the further step of forming said tactile indicia by thermography.

15. The method as claimed in claim 13 including the further step of machining said operative surface.

16. The method as claimed in claim 15 including the further step of machining said operative surface with a computer controlled cutting plotter.

DATED this Twenty-Seventh Day of July, 1999
Canon Kabushiki Kaisha
Patent Attorneys for the Applicant
SPRUSON & FERGUSON

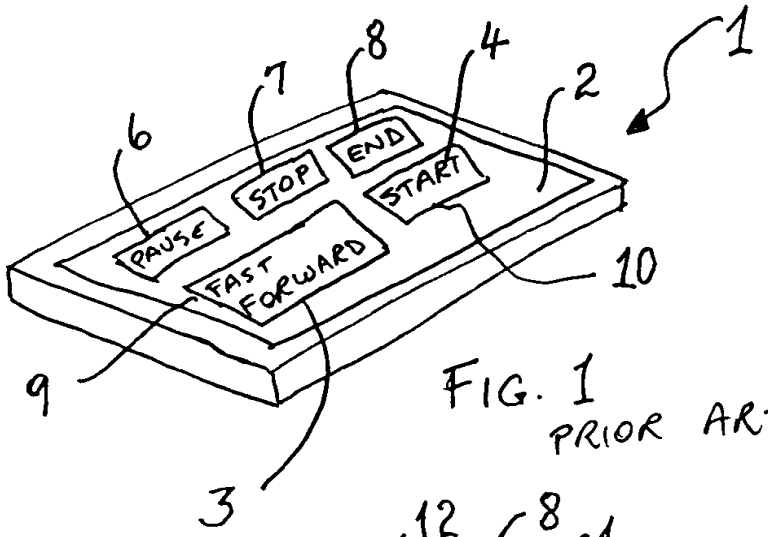

FIG. 1
PRIOR ART

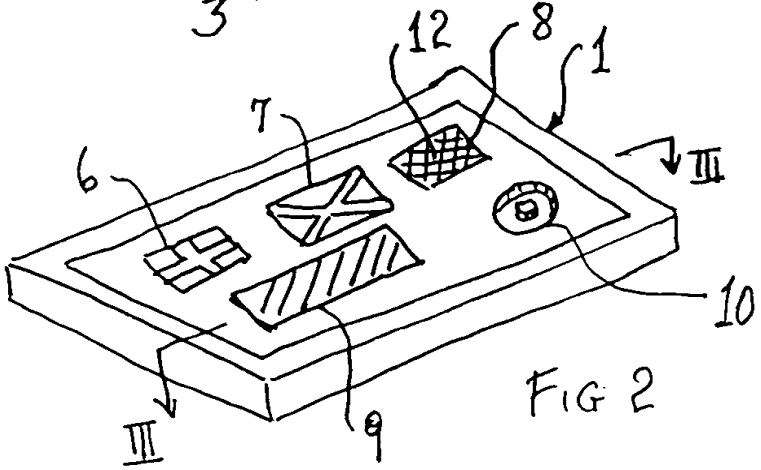

FIG 2

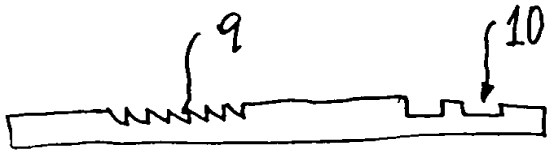

FIG 3

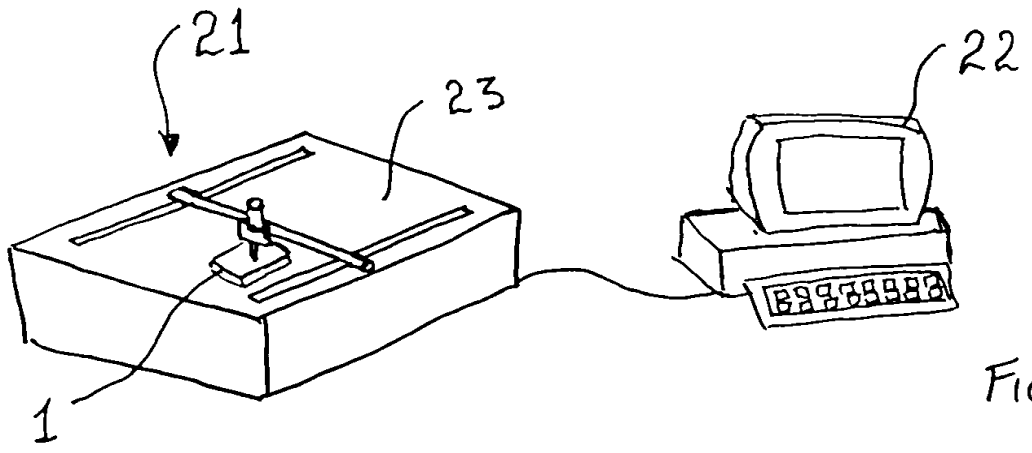

FIG. 4

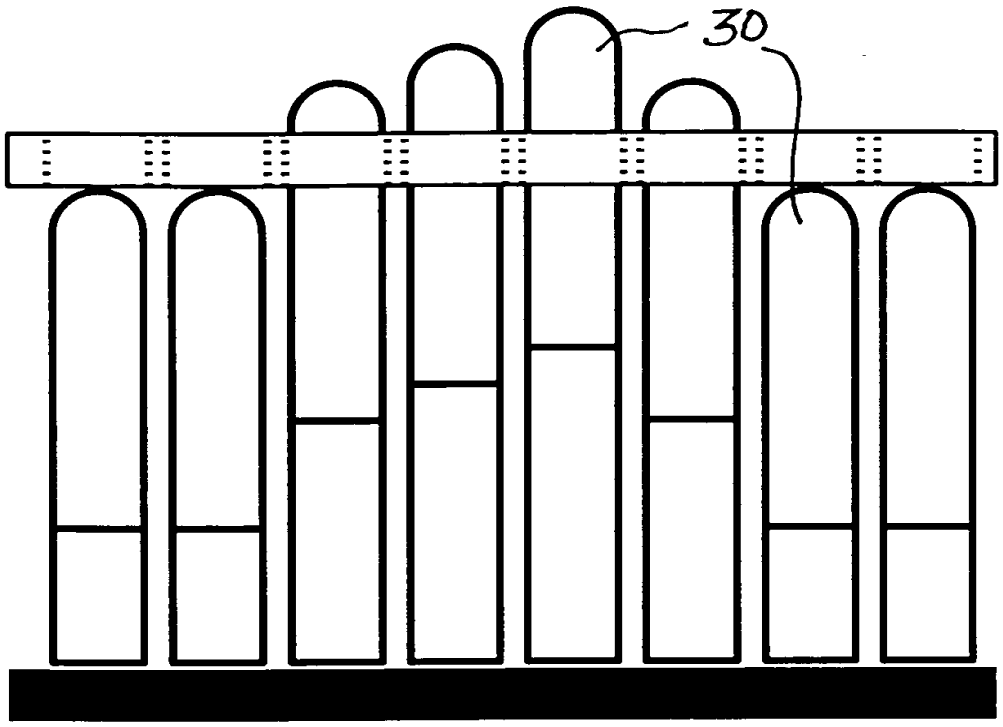

FIG. 5

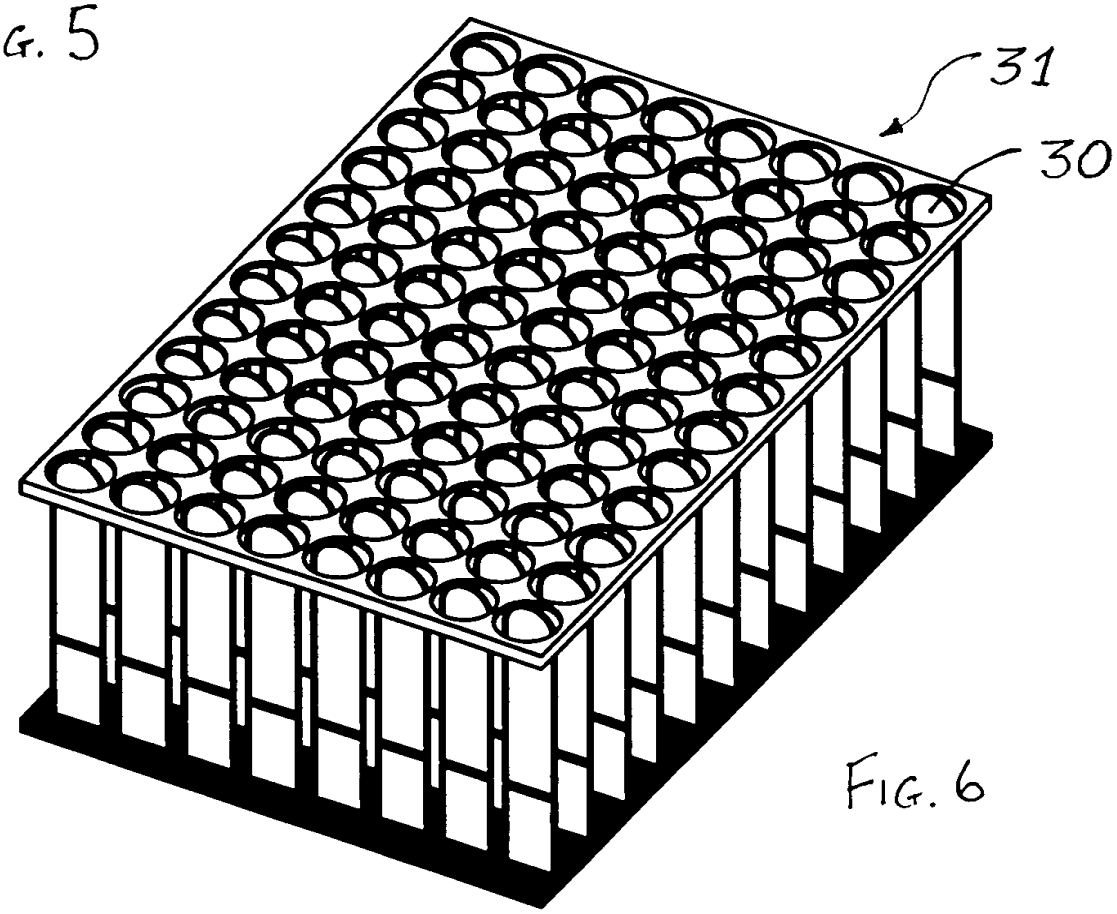

FIG. 6